



Expeditionary Logistics

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A FUTURE NAVAL CAPABILITY

ExLog FNC S&T Investment Mitigates Heavy LCAC's Highest Risk Element

The Heavy Landing Craft Air Cushion (HLCAC) is conceived to be 40% longer than the existing LCAC with the same cross-section. It is being developed to carry twice the payload of the LCAC. Two HLCACs can fit in the well deck space currently occupied by three LCACs. The net effect is that HLCAC enables the large amphibious assault ships to deliver substantially larger surface lift to the fight. The large logistical throughput required for Sea Basing makes this an attractive option to consider.

Working with NAVSEA PMS377, OPNAV N753, and NSWC CSS, the ExLog FNC identified the highest technical risk in bringing HLCAC to fruition and has made investments in this area. Specifically, the effort focused on generating nearly twice the Bollard thrust (the maximum thrust the craft can generate while stationary) and 30% more thrust at-speed from only 50% more power without increasing the diameter of the propellers. The Bollard requirement was driven by the requirement to climb a specific incline from a dead stop. The at-speed requirement was driven by the need to meet a specified underway speed. The diameter could not be increased because the HLCAC needs to operate out of the same well deck as the LCAC.

Two specific technologies were developed taking advantage of advanced aerodynamic methods. A new propulsion fan was developed to maximize the thrust production. Also, a high-efficiency lift fan was developed to increase the amount of power available for the propulsion fan. CDI Marine's Ship Development Division, formerly Band, Lavis & Associates) was employed to conduct the development.

To validate the technology development, scale model testing was conducted. The results showed two of the new lift fans could generate the flow volume and head rise required with 15% less power consumption than simply adding a third existing LCAC lift fan and would also greatly simplify the transmission arrangement. The 1/6 scale propulsor model was tested in the Glenn L. Martin Wind Tunnel at the University of Maryland. The propulsor results showed that the required thrust could be developed with the power available. The two technology investments showed that we could meet the exit criteria developed jointly with the NAVSEA PMS377 and OPNAV N753 and that the largest technical risk in the HLCAC program could be mitigated.

Points of Contact

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Highlights / Accomplishments

High Capacity Alongside Sea Base Sustainment (HiCASS)

- The evaluation team has selected three proposals from a field of 18 received from industry. All three highly qualified teams will pursue unique solutions to the technology issues of tracking and sensing platform motions, motion mitigation/compensation, sensing of wave environment, station keeping, load control and various requirements for sensing. Solving these issues is a critical enabler of material transfer in a sea way while underway.
- SBIR Phase I Final Briefings were presented at ONR for Composite RO/RO structures. Phase II selections are underway.

Strike Up/Strike Down (SUSD)

- The National Shipbuilding Research Program's (NSRP) Executive Control Board approved the recently completed SUSD Technology Roadmap. Their support increases the likelihood that advanced system technologies will transition to future platforms.

Sea Base to Shore Surface Craft (SSSC)

- HLCAC propulsor scale-model wind tunnel tests proved it could meet the S&T exit criteria. The ExLog FNC is poised for a jointly funded effort with the acquisition sponsor to develop and test a full-scale propulsor demonstrator. The decision to proceed is deferred until FY05 due to R&D funding constraints.
- Creating a program to develop technologies that enable future vehicles to fill the Beachable HSC and Heavy Vertical Lift gaps identified by N6/N7.

Naval Force Sustainment (NFS)

- Completing drawings for three concepts of the cylindrical container for blast mitigation packaging.
- Finalized the roadmap with Indian Head and Dahlgren for S&T completion in FY04.

Ground Logistics Command and Control (GLC2)

- Contract Award - requirements for Engineering Planning and Execution (Eng P&E) Module for CLC2S (Common Logistics Command and Control System). ENG P&E module will assist Naval Construction Force and USMC with engineering tasks ashore.

Naval Logistics Command and Control (NLC2)

- Reviewed responses to Sources Sought request for Naval Logistics Command and Control Capabilities in industry in preparation for next year's BAA effort.